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Th e Conservation Reserve Program and Duck Product ion in the U.S. Prairie Pothole Region

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Introduction

The Prairie Pothole Region (PPR) of North America has historically been considered the most important area of the continent for many species of waterfowl, particularly upland nesting ducks (Bellrose 1976). However, during the time since settlement of this area by Europeans, productivity by species such as mallard, gadwall, blue-winged teal, northern shoveler, and northern pintail has apparently declined. Beauchamp and others (1996) reported a system-wide decline in nest success of upland nesting duck species in the PPR between 1935 and 1992. Nest success has been identified as the single most important factor influencing population change of mallards breeding in the PPR (Hoekman and others 2002) and predation has been identified as the primary reason for nest failure of upland nesting duck species in the PPR of the U.S. (Klett and others 1988, Reynolds and others 2001). Declines in nest success in the PPR have coincided with the conversion of large areas of perennial grasslands to cropland that has presumably altered predator/prey relationships in ways unfavorable to upland nesting birds (Cowardin and others 1983). In 1985, Congress authorized the Conservation Reserve Program (CRP) as part of the Food Security Act (Public Law 99-198). Under this Act, landowners enroll cropland to be converted to perennial cover for a specified period (e.g., 10–15 years) in exchange for annual payments. The CRP has been part of all subsequent Farm Bills since the 1985 Act and resulted in approximately 4.7 million acres of cropland converted to undisturbed grass cover in the PPR of the Dakotas and northeast Montana during the period 1992–present. Conservationists have heralded the CRP as the most significant conservation program benefiting wildlife populations ever implemented by the U.S. Department of Agriculture (USDA). During the period 1992–1997, Reynolds and others (2001) conducted a study to assess the impact of CRP on duck productivity in the PPR of North Dakota, South

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Wetlands in the prairie pothole region in South Dakota. (D. Poggensee, USDA-NRCS)

Dakota, and northeast Montana. This paper presents results from that study and other data to demonstrate the benefits of CRP to waterfowl beyond 1997.

Impacts of CRP on Waterfowl in the PPR

Duck Production 1992–1997

For nesting cover to provide meaningful benefits to duck populations, certain criteria need to be met: (1) the cover must be characterized by nest success that is higher than other major cover types, (2) it should be more attractive to nesting hens than less secure competing cover, and (3) it should be accessible to a large number of nesting hens. In addition nest success should exceed 15–20% in order for productivity to balance annual mortality (Klett and others 1988). During the period 1992–1997, Reynolds and others (2001) studied use and success by five duck species (mallards, gadwall, blue-winged teal, northern shoveler, and northern pintail) nesting in CRP cover in the U.S. PPR. These investigators searched over 30,000 acres of CRP cover in the Dakotas and Northeast Montana and collected information on over 10,000 duck nests. Results from that study showed that nest success in CRP, averaged among years and species, was 23%, and was higher than any other major cover type used by ducks. They found that CRP cover was preferred over all other major cover types on the landscape by all duck species studied, and that 30% of all successful nests across the study area were initiated in CRP fields that accounted for 7% of the total land area. They also found that nest success in CRP fields was positively related to the percent of total perennial cover on the study sites and that nest success in other cover types was higher during the CRP period than that observed prior to the CRP. They concluded that CRP was having a positive impact on the entire landscape. Overall, these investigators estimated that duck productivity in the PPR increased by 30% compared to that expected in the absence of CRP and that an additional 12.4 million ducks (2.1 million per year) were produced in the U.S. PPR during the study period over what would have occurred in the absence of the CRP. This is equivalent to approximately 33% of the entire U.S. harvest of those species studied during the 6-year period.

Duck Production 1998–2002

Models developed from the 1992–1997 study can be used to estimate the impact of CRP on duck production beyond 1997 if certain information is available and/or assumptions made as follows: (1) estimates of duck breeding pair numbers and distribution are available annually, (2) the distribution of CRP since the 1996 Farm Bill is available in the digital/spatial database, and (3) nest success estimates were updated or assumed to be unchanged since the 1992–1997 period. The U.S. Fish and Wildlife Service continued to annually survey duck breeding populations since

1997 and therefore this critical component of evaluation exists. Because broad-scale temporal variation in nest success was not observed during the 1992–1997 period (Reynolds and others 2001), the assumption that nest success has remained similar in subsequent years seems to be reasonable. The most important change that has occurred since 1997 has been the amount and distribution of CRP throughout the PPR. There have been large shifts among counties and states in the region that will need to be incorporated into any serious attempt to quantify CRP benefits to waterfowl production beyond 1997. However, a rather crude examination can be made if we assume the current CRP is equivalent to that which was in place during1992–1997. Under those conditions, model projections predict that during the 1998–2003 period (period for which breeding populations have been summarized) an additional 13.3 million (2.2 million/year) puddle ducks have been produced as a result of the CRP. The slightly greater average annual incremental increase during the 1998–2002 period compared to the 1992–1997 period is due to the larger average breeding population size during the later period. This brings the total incremental increased production of ducks to 25.7 million for the period 1992–2003.

Mallard ducks in a prairie pothole wetland. (D. Poggensee, USDA-NRCS)

Breeding Duck Pairs and Wetlands in CRP Fields

In addition to providing relatively secure nesting cover for upland nesting ducks, the CRP has the potential to impact the number of breeding ducks settling in the U.S. PPR. There is speculation that homing by adult and young females due to increased productivity from CRP has resulted in greater than expected densities of breeding duck pairs using much of the U.S. PPR. However, wetland habitat has also been positively affected by CRP cover. Wetlands that occur in grasslands tend to attract higher densities of ducks and are considered superior in biological function to those that occur in cropland (Kantrud and Newton 1996, Krapu and others 1997). I examined breeding duck data from over 2,400 wetland observations collected by the U.S. Fish and Wildlife Service (USFWS, Habitat and Population Evaluation Team, Bismarck, ND, unpublished data) for the period 2000–2003 to compare the density of 13 combined duck species using three classes (Cowardin and others 1979) of wetlands occurring in CRP fields (n = 466) and crop fields (n = 1957). Wetlands in both CRP and crop fields showed frequent use by breeding ducks, but greater densities were recorded for wetlands in CRP fields compared to those in crop fields (Figure 1). These results suggest that CRP cover planted around wetlands and the curtailment of disturbance associated with tilling and planting crops has improved the function of wetlands relative to breeding duck use. This impact is not trivial as evidenced by estimates from landscape samples that indicate there are about

230,000 acres of small-shallow (temporary and seasonal) wetlands in CRP fields throughout the PPR. These wetlands attracted 492,000 duck pairs annually during years 2000–2003, which was 210,000 more pairs per year than if they had been in cropland instead of the CRP.

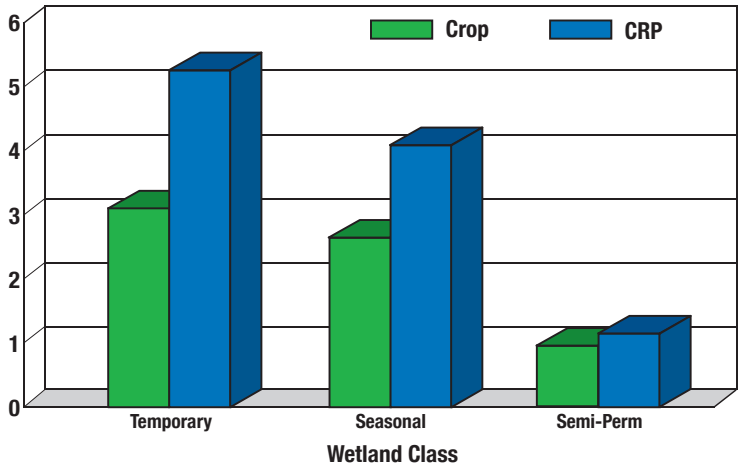

Figure 1. Duck pairs/wet acre (13 species combined) on wetlands occurring in crop fields versus those in CRP fields in the U.S. Prairie Pothole Region during spring 2000–2003.

Wetland Conservation

CRP cover provides benefit to duck production only when this cover occurs in proximity to wetlands that attract numerous breeding hens. Some nesting hens will travel as much as 2 miles or more from core wetlands to access suitable nesting cover (Derrickson 1975, Dwyer and others 1979, Cowardin and others 1985). Loss of wetlands due to drainage can have a significant effect by reducing the capability of an area to attract ducks. Tiner (1984) reported that over half of the original 7 million acres of pothole wetlands in the Dakotas have already been lost, mostly due to agriculture. In addition, small shallow wetlands in the PPR are critical to brood survival by providing security from predators (Krapu and others 2000) and food requirements for developing ducklings. Since 1985, all Farm Bills have included conservation compliance (Swampbuster) provisions that restrict wetlands from being drained and converted to cropland. Swampbuster has been effective in reducing wetland loss, but

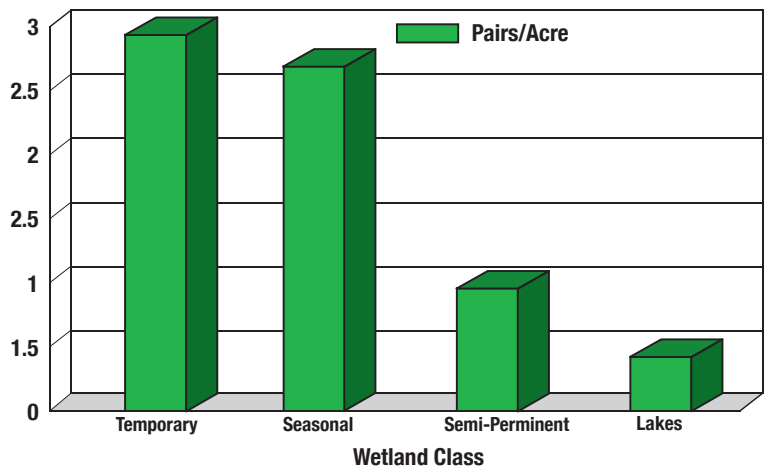

Figure 2. Duck pairs/wet acre (13 species combined) observed on four classes of wetlands in the U.S. Prairie Pothole Region during May 2000–2003.

some farm groups question the need to protect small-shallow wetlands that interfere with tilling and planting. I examined data collected by the U.S. Fish and Wildlife Service (USFWS, Habitat and Population Evaluation Team, Bismarck, ND, unpublished data) during the period 1987–2003 to determine which wetland types attracted the highest amount of use by breeding ducks in the U.S. PPR. The types of wetlands in all land uses that showed the highest use by breeding ducks were temporary and seasonal classes (Figure 2) that averaged only 0.60 and 1.46 acres in area, respectively. Further examination of this data revealed that 63% of all dabbling ducks in the area depend on temporary and seasonal wetlands that are less than 1 acre in area and the majority of these wetlands occur in crop fields.

Discussion

The PPR of the U.S. is the most important breeding area in the nation for many duck species. The PPR area of the Dakotas makes up about 7% of the traditional waterfowl survey area (Cowardin and Blohm 1992) that is considered the principal breeding range for ducks in North America (Reynolds 1987). During the period 1994–2002, 21% of all breeding ducks from the traditional continental survey area occurred in the PPR of the Dakotas (U.S. Fish and Wildlife Service Administrative Reports 1994–2002). The CRP has been popular with landowners in this area who have enrolled and maintained nearly 5 million acres of land in the program since 1992. Reynolds and others (2001) documented the importance of CRP to duck production and concluded the program has provided widespread landscape level affects. In addition, CRP cover appears to have improved the attractiveness of certain wetlands and increased the carrying capacity of breeding ducks in the region.

Notwithstanding the demonstrated benefits CRP has provided for waterfowl in the PPR, there is concern about the future continuation of these benefits. Nearly 2.5 million acres (>1/2 of the total) of CRP in the PPR is due to expire in 2007 and by 2010 only about 20% of the current CRP acres will remain in active contracts. The CRP will need to be reauthorized prior to contract expiration if benefits to waterfowl are to continue. However, even with reauthorization of the CRP, changes need to be made in the current Environmental Benefit Index (EBI) (used to determine which CRP contracts are accepted by USDA) if waterfowl are considered a conservation priority. The EBI has changed considerably since sign-ups in 1997–2000 when most of the CRP in the PPR was contracted. EBI criteria for earlier sign-ups included points for offers in the PPR National Conservation Priority Area, proximity to wetlands, proximity to protected areas such as National Wildlife Refuge System Waterfowl Production Areas, and upland to wetland ratios that allowed

enrollment of entire fields with numerous pothole wetlands. The most recent sign-ups emphasized criteria such as riparian buffers, shelterbelts, grass waterways, contour grass strips, wetland buffers, and filter strips (USDA, Farm Service Agency 2004). While these later criteria may result in plantings that provide certain conservation benefits, they are unlikely to be compatible with the habitat needs of prairie ducks. Idle grass plantings with these configurations are similar to road rights-of-way and other fragmented habitats described by Cowardin and others (1988) that are attractive to nesting ducks, but have been characterized by low nest success due to excessive predation (Klett and others 1988, Reynolds and others 2001). Conversely, landscapes that have been shown to be associated with high duck productivity include large blocks (e.g., ≥32 ha) of CRP associated with other CRP or perennial grasslands in close proximity to wetland complexes that support moderate to high densities of breeding duck pairs. Whole field enrollments in CRP cover will be needed to meet the nesting habitat requirements of upland nesting ducks.

As a result of EBI changes in later sign-ups, only 12% (50,954 acres) of 428,470 acres of CRP offered from the Dakotas were accepted during the most recent general sign-up (signup 26) (USDA, Farm Services Agency news release (2004). This is in contrast to the national CRP acceptance rate of 48%. If waterfowl are intended to be a priority wildlife group for a future CRP, practices popular with landowners in the PPR will need to be emphasized (Table 1). Also, the USDA should consider using available biological data to maximize the waterfowl benefits from the program. The USFWS Habitat and Population Evaluation Teams in Bismarck, North Dakota, and Fergus Falls, Minnesota, have developed spatially explicit models and used Geographic Information System technology to create maps that can be used to target programs such as CRP to achieve the greatest waterfowl production results (e.g., Reynolds and others 1996). Maps developed from these models can be made available for the entire PPR.

Table 1. Percent distribution of Conservation Reserve Program (CRP) by practice category for states that make up the majority of the U.S. Prairie Pothole Region[a].

CRP practice	Percentage of total CRP in the north-central Plains
CP-1: Introduced grasses	16.5%
CP-2: Native grasses	12.6%
CP-4: Wildlife habitat	10.4%
CP-10: Established grasses	35.1%
CP-23: Wetland restoration	15.0%
All other practices combined	8.4%

[a] Includes North Dakota, South Dakota, Montana, and Minnesota.

Conclusions

In summary, the CRP has resulted in significantly increased duck productivity from the most important duck breeding area in North America. Ducks produced in the PPR migrate to virtually every state,

province, and territory in North America, Mexico, and several countries in South America. Waterfowl hunters and observers nationwide have been the beneficiaries of the CRP. In order to maintain duck production levels in the PPR, at least 5 million acres of CRP will need to be targeted toward areas of moderate to high duck density. To maximize duck production and meet other migratory bird and upland bird population goals in the region, a total of 8 million acres of CRP cover is recommended (Wildlife Management Institute 2001). Finally, Swampbuster provisions of the Farm Bill must be continued to protect wetlands habitat critical to breeding waterfowl and broods. Waterfowl enthusiasts nationwide will be looking forward to continuing the benefits of these landmark conservation initiatives.

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